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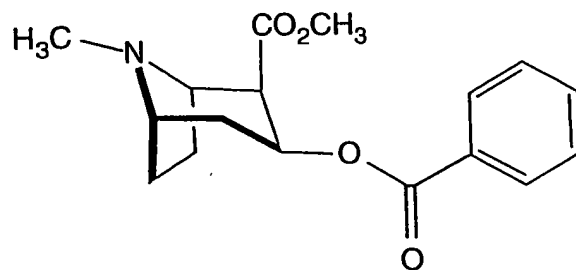
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(-)-COCAINE

FIG. 1A

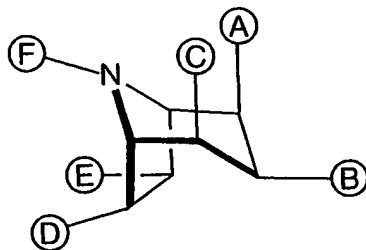


FIG. 1B

CJ#	Branch	
CJ 0	Q	Q = H, OH, CH <sub>2</sub> , HALOGEN, COOH, CARRIER PROTEIN, MODIFIED CARRIER PROTEIN
CJ 1	(CH <sub>2</sub> ) <sub>n</sub> Q	Q = H, COOH, HALOGEN, 2-NITRO-4-SULFOPHENYL ESTER, N-OXYSUCCINIMIDYL ESTER, CARRIER PROTEIN, MODIFIED CARRIER PROTEIN, CJ 1.2
CJ 1.1	CO <sub>2</sub> Q	Q = H, CH <sub>3</sub>
CJ 1.2	COQ	Q = H, HALOGEN, 1-OXY-2-NITRO-4-SULFOPHENYL, N-OXYSUCCINIMIDYL, N-MALEIMIDYL, CARRIER PROTEIN, CJ 10
CJ 2	OCO(CH <sub>2</sub> ) <sub>n</sub> Q	Q = COOH, HALOGEN, 2-NITRO-4-SULFOPHENYL ESTER, N-OXYSUCCINIMIDYL ESTER, CARRIER PROTEIN, MODIFIED CARRIER PROTEIN
CJ 2.1	OCOCH=Q	Q = H
CJ 2.2	OCOCH(O)CH <sub>2</sub>	
CJ 2.3	OCO(CH <sub>2</sub> ) <sub>n</sub> CH(O)CH <sub>2</sub>	
CJ 3	CO(CH <sub>2</sub> ) <sub>n</sub> COQ	Q = H, OH, HALOGEN, 1-OXY-2-NITRO-4-SULFOPHENYL, N-OXYSUCCINIMIDYL, N-MALEIMIDYL, CARRIER PROTEIN, CJ 10
CJ 3.1	CO(CH <sub>2</sub> ) <sub>n</sub> CNQ	Q = OCH <sub>3</sub> or CARRIER PROTEIN
CJ 4	OCO(CH <sub>2</sub> ) <sub>n</sub> COQ	Q = H, OH, HALOGEN, 1-OXY-2-NITRO-4-SULFOPHENYL, N-OXYSUCCINIMIDYL, N-MALEIMIDYL, CARRIER PROTEIN, CJ 10
CJ 4.1	CO(CH <sub>2</sub> ) <sub>n</sub> CNQ	Q = OCH <sub>3</sub> or CARRIER PROTEIN
CJ 5	CH <sub>2</sub> OCO(CH <sub>2</sub> ) <sub>n</sub> COQ	Q = H, OH, HALOGEN, 1-OXY-2-NITRO-4-SULFOPHENYL, N-OXYSUCCINIMIDYL, N-MALEIMIDYL, CARRIER PROTEIN, CJ 10
CJ 5.1	CO(CH <sub>2</sub> ) <sub>n</sub> CNQ	Q = OCH <sub>3</sub> or CARRIER PROTEIN
CJ 6	CONH(CH <sub>2</sub> ) <sub>n</sub> Q	Q = H, COOH, HALOGEN, 2-NITRO-4-SULFOPHENYL ESTER, N-OXYSUCCINIMIDYL ESTER, CARRIER PROTEIN, MODIFIED CARRIER PROTEIN
CJ 7	Y(CH <sub>2</sub> ) <sub>n</sub> Q	Y = S, O, NH; Q = HALOGEN, COOH, CARRIER PROTEIN, MODIFIED CARRIER PROTEIN
CJ 7.1	CH <sub>2</sub> Y(CH <sub>2</sub> ) <sub>n</sub> Q	Y = S, O, NH; Q = HALOGEN, COOH, CARRIER PROTEIN, MODIFIED CARRIER PROTEIN
CJ 8	OCOCH(OH)CH <sub>2</sub> Q	Q = CARRIER PROTEIN, MODIFIED CARRIER PROTEIN
CJ 8.1	OCO(CH <sub>2</sub> ) <sub>n</sub> CH(OH)CH <sub>2</sub> Q	Q = CARRIER PROTEIN, MODIFIED CARRIER PROTEIN
CJ 9	OCOC <sub>6</sub> H <sub>5</sub>	
CJ 11	YCO(CH <sub>2</sub> ) <sub>n</sub> COQ	Y = S, O, NH; Q = OH, CARRIER PROTEIN, MODIFIED CARRIER PROTEIN or HALOGEN

FIG. 2A

## ALTERNATIVE REPRESENTATION FOR SELECTED BRANCHES

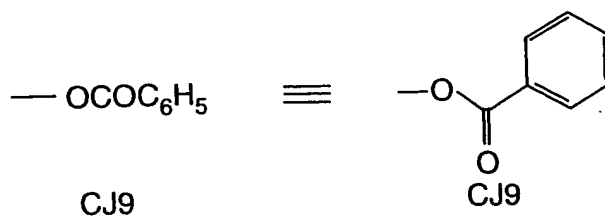
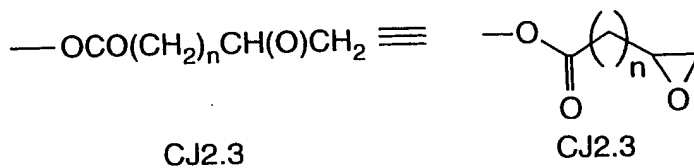
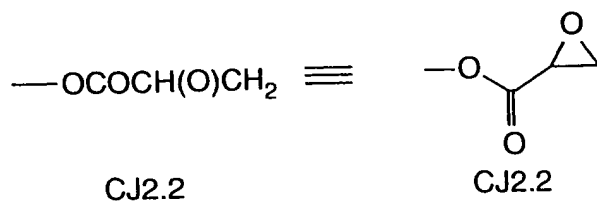
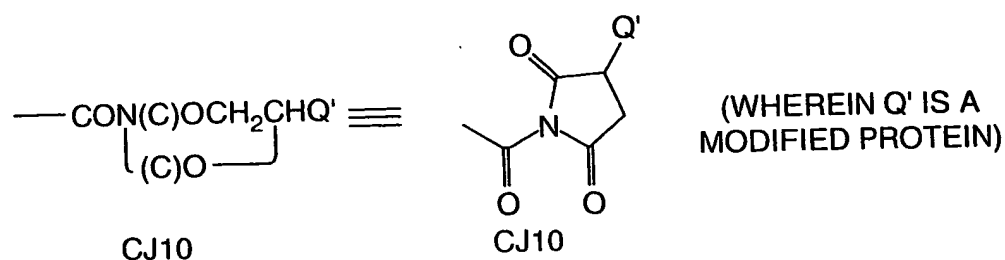


FIG. 2B

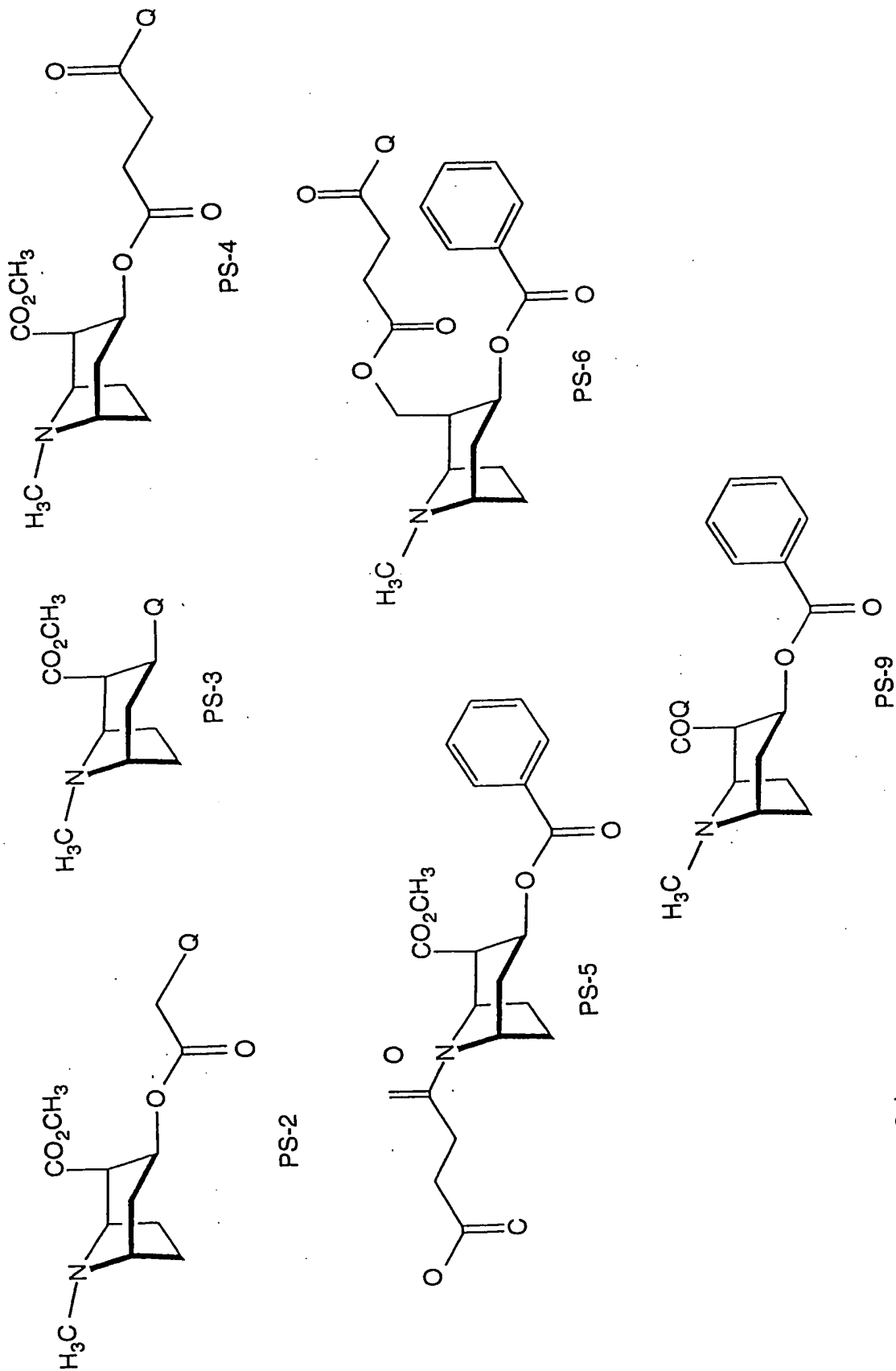


FIG. 3A

BRANCHES						
	A	B	C	D	E	F
	CJ1.1 WHERE Q=CH <sub>3</sub>	CJ2 WHERE Q= HALOGEN OR MODIFIED T CELL EPIOTOPE CONTAINING CARRIER AND n=1	CJ0 WHERE Q=H	CJ0 WHERE Q=H	CJ0 WHERE Q=H	CJ1 WHERE Q=H, n=1
PS-2						
	CJ1.1 WHERE Q=CH <sub>3</sub>	CJ0 WHERE Q= MODIFIED T CELL EPIOTOPE CONTAINING CARRIER	CJ0 WHERE Q=H	CJ0 WHERE Q=H	CJ0 WHERE Q=H	CJ1 WHERE Q=H, n=1
PS-3						
	CJ1.1 WHERE Q=CH <sub>3</sub>	CJ4 WHERE Q= MODIFIED T CELL EPIOTOPE CONTAINING CARRIER AND n=1	CJ0 WHERE Q=H	CJ0 WHERE Q=H	CJ0 WHERE Q=H	CJ1 WHERE Q=H, n=1
PS-4						
	CJ1.1 WHERE Q=CH <sub>3</sub>	CJ9	CJ0 WHERE Q=H	CJ0 WHERE Q=H	CJ0 WHERE Q=H	CJ3 WHERE Q=CARRIER PROTEIN, n=2
PS-5						
	CJ5 WHERE Q=CARRIER PROTEIN AND n=2	CJ9	CJ0 WHERE Q=H	CJ0 WHERE Q=H	CJ0 WHERE Q=H	CJ1 WHERE Q=H, n=1
PS-6						
	CJ1.2 WHERE Q=CARRIER PROTEIN	CJ9	CJ0 WHERE Q=H	CJ0 WHERE Q=H	CJ0 WHERE Q=H	CJ1 WHERE Q=H, n=1
PS-9						
	CJ6 WHERE Q=H OR CJ1.1 WHERE Q=CH <sub>3</sub>	CJ2 WHERE Q=HALOGEN	CJ0 WHERE Q=H	CJ0 WHERE Q=H	CJ0 WHERE Q=H	CJ1 WHERE Q=H, n=1
PS-10						
	CJ6 WHERE Q=H OR CL1.1 WHERE Q=CH <sub>3</sub>	CJ2 WHERE Q = MODIFIED T CELL EPIOTOPE CONTAINING CARRIER	CJ0 WHERE Q=H	CJ0 WHERE Q=H	CJ0 WHERE Q=H	CJ1 WHERE Q=H, n=1
PS-11						
	CJ6 WHERE Q=H OR CJ1.1 WHERE Q=CH <sub>3</sub>	CJ2.1	CJ0 WHERE Q=H	CJ0 WHERE Q=H	CJ0 WHERE Q=H	CJ1 WHERE Q=H, n=1
PS-12						

FIG. 3B(1)

PRECUSORS/CONJUGATES

BRANCHES						
	CJ6 WHERE Q=H OR CJ1.1 WHERE Q=CH <sub>3</sub>	CJ2 Q=CARRIER PROTEIN OR MODIFIED T CELL EPIOTOPE CONTAINING CARRIER AND n=2	CJ0 WHERE Q=H	CJ0 WHERE Q=H	CJ0 WHERE Q=H	CJ1 WHERE Q=H, n=1
PS-13						
PS-14	CJ6 WHERE Q=H OR CJ1.1 WHERE Q=CH <sub>3</sub>	CJ2.2	CJ0 WHERE Q=H	CJ0 WHERE Q=H	CJ0 WHERE Q=H	CJ1 WHERE Q=H, n=1
PS-15	CJ6 WHERE Q=H OR CJ1.1 WHERE Q=CH <sub>3</sub>	CJ8	CJ0 WHERE Q=H	CJ0 WHERE Q=H	CJ0 WHERE Q=H	CJ1 WHERE Q=H, n=1
PS-16	CJ6 WHERE Q=H OR CJ1.1 WHERE Q=CH <sub>3</sub>	CJ2.3	CJ0 WHERE Q=H	CJ0 WHERE Q=H	CJ0 WHERE Q=H	CJ1 WHERE Q=H, n=1
PS-17	CJ6 WHERE Q=H OR CJ1.1 WHERE Q=CH <sub>3</sub>	CJ8.1	CJ0 WHERE Q=H	CJ0 WHERE Q=H	CJ0 WHERE Q=H	CJ1 WHERE Q=H, n=1
PS-18	CJ6 WHERE Q=H OR CJ1.1 WHERE Q=CH <sub>3</sub>	CJ4	CJ0 WHERE Q=H	CJ0 WHERE Q=H	CJ0 WHERE Q=H	CJ1 WHERE Q=H, n=1
PS-19	CJ6 WHERE Q=H OR CJ1.1 WHERE Q=CH <sub>3</sub>	CL 1 WHERE Q=COOH, HALOGEN, 2-NITRO-4- SULFOPHENYL ESTER, N- OXYSUCCINIMIDYL ESTER, CARRIER PROTEIN OR MODIFIED CARRIER	CJ0 WHERE Q=H	CJ0 WHERE Q=H	CJ0 WHERE Q=H	CJ1 WHERE Q=H, n=1
PS-20	CJ6 WHERE Q=H OR CJ1.1 WHERE Q=CH <sub>3</sub>	CJ7	CJ0 WHERE Q=H	CJ0 WHERE Q=H	CJ0 WHERE Q=H	CJ1 WHERE Q=H, n=1
PS-21	CJ6 WHERE Q=H OR CJ1.1 WHERE Q=CH <sub>3</sub>	CJ9	CJ0 WHERE Q=H	CJ0 WHERE Q=H	CJ0 WHERE Q=H	CJ3

FIG. 3B(2)

PRECUSORS/CONJUGATES

BRANCHES						
PS-22	CJ6 WHERE Q=H OR CJ1.1 WHERE Q=CH <sub>3</sub>	CJ9	CJ0 WHERE Q=H	CJ0 WHERE Q=H	CJ0 WHERE Q=H	CJ1 WHERE Q=CJ1.2
PS-23	CJ5	CJ9	CJ0 WHERE Q=H	CJ0 WHERE Q=H	CJ0 WHERE Q=H	CJ1 WHERE Q=H
PS-24	CJ7.1	CJ9	CJ0 WHERE Q=H	CJ0 WHERE Q=H	CJ0 WHERE Q=H	CJ1 WHERE Q=H
PS-25	CJ7	CJ9	CJ0 WHERE Q=H	CJ0 WHERE Q=H	CJ0 WHERE Q=H	CJ1 WHERE Q=H
PS-26	CJ1.2	CJ9	CJ0 WHERE Q=H	CJ0 WHERE Q=H	CJ0 WHERE Q=H	CJ1 WHERE Q=H
PS-27	CJ6 WHERE Q=H OR CJ1.1 WHERE Q=CH <sub>3</sub>	CJ9	CJ2	CJ0 WHERE Q=H	CJ0 WHERE Q=H	CJ1 WHERE Q=H, n=1
PS-28	CJ6 WHERE Q=H OR CJ1.1 WHERE Q=CH <sub>3</sub>	CJ9	CL1 WHERE Q=COOH, HALOGEN 2-NITRO-4-SULFOPHENYL ESTER, N-OXY- SUCCINIMIDYL ESTER, CARRIER PROTEIN, MODI- FIED T CELL EP- ITOPE CONTAIN- ING CARRIER, CJ1.2	CJ0 WHERE Q=H	CJ0 WHERE Q=H	CJ1 WHERE Q=H, n=1
PS-29	CJ6 WHERE Q=H OR CJ1.1 WHERE Q=CH <sub>3</sub>	CJ9	CJ2.2	CJ0 WHERE Q=H	CJ0 WHERE Q=H	CJ1 WHERE Q=H, n=1
PS-30	CJ6 WHERE Q=H OR CJ1.1 WHERE Q=CH <sub>3</sub>	CJ9	CJ8	CJ0 WHERE Q=H	CJ0 WHERE Q=H	CJ1 WHERE Q=H, n=1
PS-31	CJ6 WHERE Q=H OR CJ1.1 WHERE Q=CH <sub>3</sub>	CJ9	CJ2.3	CJ0 WHERE Q=H	CJ0 WHERE Q=H	CJ1 WHERE Q=H, n=1

FIG. 3B(3)

PRECURSORS/CONJUGATES



BRANCHES						
PS-32	CJ6 WHERE Q=H OR CJ1.1 WHERE Q=CH <sub>3</sub>	CJ9	CJ8.1	CJ0 WHERE Q=H	CJ0 WHERE Q=H	CJ1 WHERE Q=H, n=1
PS-33	CJ6 WHERE Q=H OR CJ1.1 WHERE Q=CH <sub>3</sub>	CJ9	CJ4	CJ0 WHERE Q=H	CJ0 WHERE Q=H	CJ1 WHERE Q=H, n=1
PS-34	CJ6 WHERE Q=H OR CJ1.1 WHERE Q=CH <sub>3</sub>	CJ9	CJ5	CJ0 WHERE Q=H	CJ0 WHERE Q=H	CJ1 WHERE Q=H, n=1
PS-35	CJ6 WHERE Q=H OR CJ1.1 WHERE Q=CH <sub>3</sub>	CJ9	CJ0 WHERE Q=H	CJ2	CJ0 WHERE Q=H	CJ1 WHERE Q=H, n=1
PS-36	CJ6 WHERE Q=H OR CJ1.1 WHERE Q=CH <sub>3</sub>	CJ9	CJ0 WHERE Q=H	CL1 WHERE Q= COOH, HALOGEN 2-NITRO-4- SULFOPHENYL ESTER, N-OXY- ESTER, CARRIER PROTEIN, MODI- FIED T CELL EP- ITOPE CONTAIN- ING CARRIER, CJ1.2	CJ0 WHERE Q=H	CJ1 WHERE Q=H, n=1
PS-37	CJ6 WHERE Q=H OR CL1.1 WHERE Q=CH <sub>3</sub>	CJ9	CJ0 WHERE Q=H	CJ2.2	CJ0 WHERE Q=H	CJ1 WHERE Q=H, n=1
PS-38	CJ6 WHERE Q=H OR CL1.1 WHERE Q=CH <sub>3</sub>	CJ9	CJ0 WHERE Q=H	CJ8	CJ0 WHERE Q=H	CJ1 WHERE Q=H, n=1
PS-39	CJ6 WHERE Q=H OR CL1.1 WHERE Q=CH <sub>3</sub>	CJ9	CJ0 WHERE Q=H	CJ2.3	CJ0 WHERE Q=H	CJ1 WHERE Q=H, n=1

FIG. 3B(4)

↑  
 PRECURSORS/CONJUGATES

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AND METHODS FOR PREPARATION OF SAME

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BRANCHES						
PS-40	CJ6 WHERE Q=H OR CJ1.1 WHERE Q=CH <sub>3</sub>	CJ9	CJ0 WHERE Q=H	CJ8.1	CJ0 WHERE Q=H	CJ1 WHERE Q=H, n=1
PS-41	CJ6 WHERE Q=H OR CJ1.1 WHERE Q=CH <sub>3</sub>	CJ9	CJ0 WHERE Q=H	CJ4	CJ0 WHERE Q=H	CJ1 WHERE Q=H, n=1
PS-42	CJ6 WHERE Q=H OR CJ1.1 WHERE Q=CH <sub>3</sub>	CJ9	CJ0 WHERE Q=H	CJ5	CJ0 WHERE Q=H	CJ1 WHERE Q=H, n=1
PS-43	CJ6 WHERE Q=H OR CJ1.1 WHERE Q=CH <sub>3</sub>	CJ9	CJ0 WHERE Q=H	CJ0 WHERE Q=H	CJ2	CJ1 WHERE Q=H, n=1
PS-44	CJ6 WHERE Q=H OR CJ1.1 WHERE Q=CH <sub>3</sub>	CJ9	CJ0 WHERE Q=H	CJ0 WHERE Q=H	CL1 WHERE Q=COOH, HALOGEN 2-NITRO-4-SULFOPHENYL ESTER, N-OXY-SUCCINIMIDYL ESTER, CARRIER PROTEIN, MODIFIED T CELL EP-ITOPIC CONTAINING CARRIER, CJ1.2	CJ1 WHERE Q=H, n=1

↑  
PRECUSORS/CONJUGATES

FIG. 3B(5)

BRANCHES						
PS-45	CJ6 WHERE Q=H OR CJ1.1 WHERE Q=CH <sub>3</sub>	CJ9	CJ0 WHERE Q=H	CJ0 WHERE Q=H	CJ2.2	CJ1 WHERE Q=H, n=1
PS-46	CJ6 WHERE Q=H OR CJ1.1 WHERE Q=CH <sub>3</sub>	CJ9	CJ0 WHERE Q=H	CJ0 WHERE Q=H	CJ8	CJ1 WHERE Q=H, n=1
PS-47	CJ6 WHERE Q=H OR CJ1.1 WHERE Q=CH <sub>3</sub>	CJ9	CJ0 WHERE Q=H	CJ0 WHERE Q=H	CJ2.3	CJ1 WHERE Q=H, n=1
PS-48	CJ6 WHERE Q=H OR CJ1.1 WHERE Q=CH <sub>3</sub>	CJ9	CJ0 WHERE Q=H	CJ0 WHERE Q=H	CJ8.1	CJ1 WHERE Q=H, n=1
PS-49	CJ6 WHERE Q=H OR CJ1.1 WHERE Q=CH <sub>3</sub>	CJ9	CJ0 WHERE Q=H	CJ0 WHERE Q=H	CJ4	CJ1 WHERE Q=H, n=1
PS-50	CJ6 WHERE Q=H OR CJ1.1 WHERE Q=CH <sub>3</sub>	CJ9	CJ0 WHERE Q=H	CJ0 WHERE Q=H	CJ5	CJ1 WHERE Q=H, n=1

PRECUSORS/CONJUGATES
----------------------

FIG. 3B(6)

	A	B	C	D	E	F
COCAINE	CJ1.1 WHERE Q=CH3	CJ9	CJ0 WHERE Q=H	CJ0 WHERE Q=H	CJ0 WHERE Q=H	CJ1 WHERE Q=H, n=1
ECGONINE METHYL ESTER	CJ1.1 WHERE Q=CH3	CJ10 WHERE Q=H	CJ0 WHERE Q=H	CJ0 WHERE Q=H	CJ0 WHERE Q=H	CJ1 WHERE Q=H, n=1
NORCOCAINE	CJ1.1 WHERE Q=CH3	CJ9	CJ0 WHERE Q=H	CJ0 WHERE Q=H	CJ0 WHERE Q=H	CJ0 WHERE Q=H
BENZOYL ECGONINE	CJ0 WHERE Q=COOH	CJ9	CJ0 WHERE Q=H	CJ0 WHERE Q=H	CJ0 WHERE Q=H	CJ1 WHERE Q=H, n=1

FIG. 4

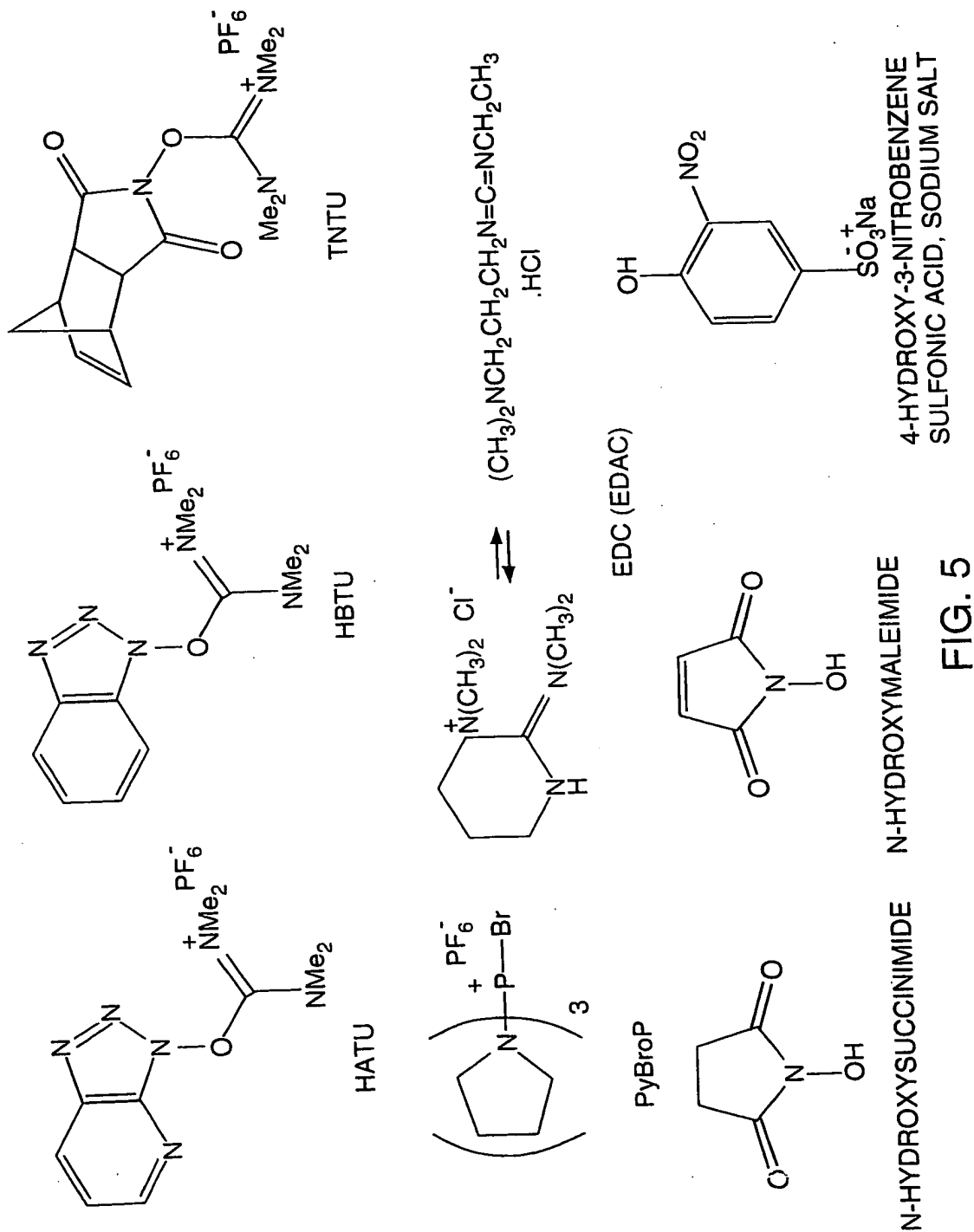
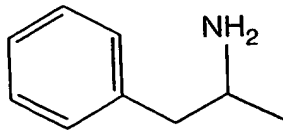
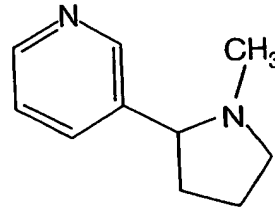


FIG. 5

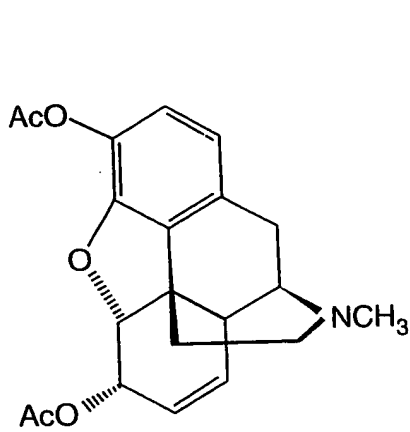
## OTHER COMMONLY ABUSED DRUGS



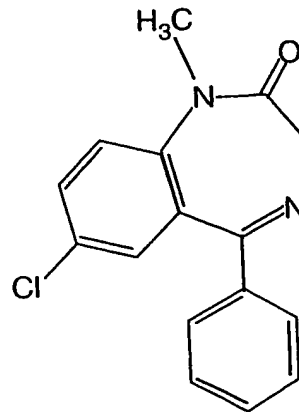
AMPHETAMINE



NICOTINE



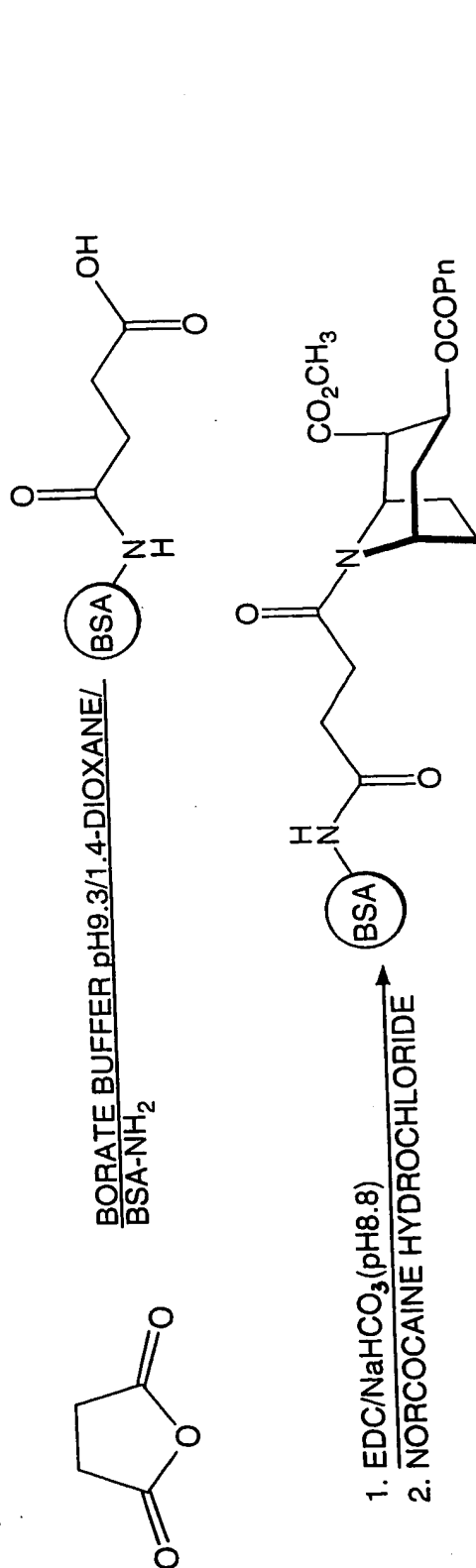
HEROIN



DIAZEPAM

FIG. 6

## METHOD A



## METHOD B

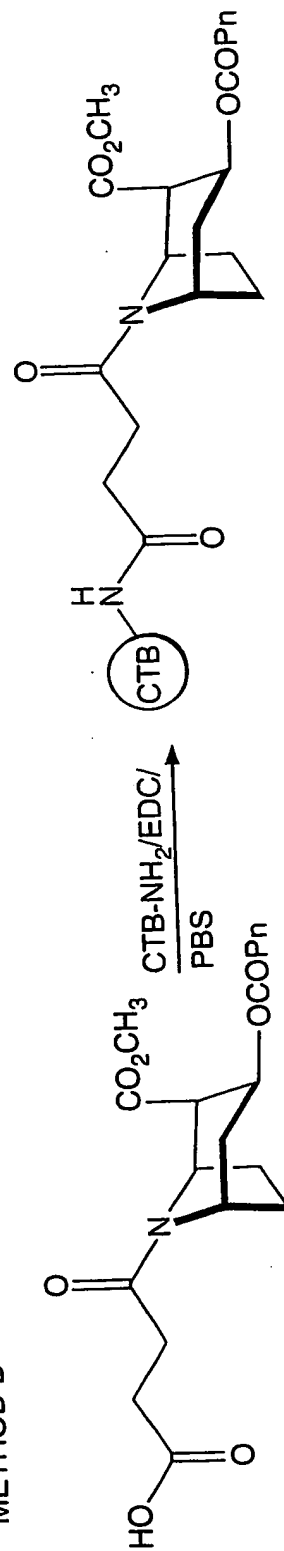


FIG. 7

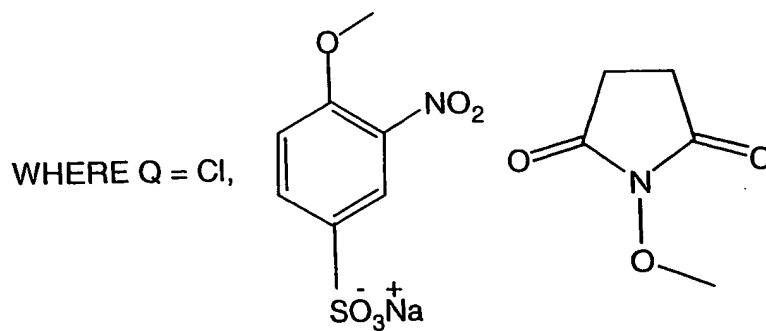
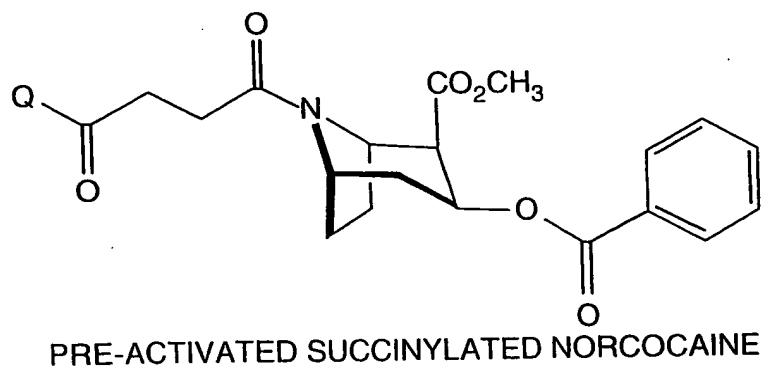
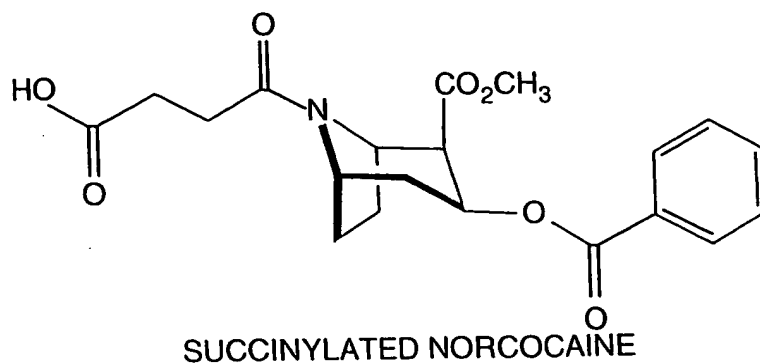


FIG. 8



FIG. 9A

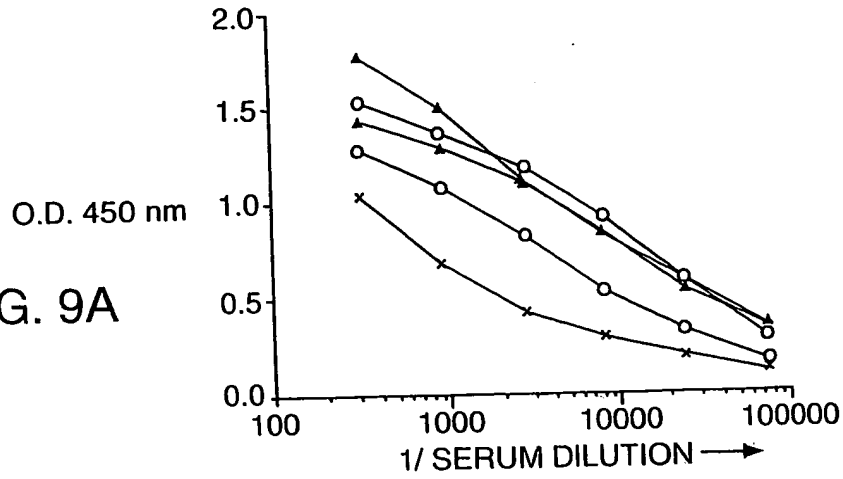


FIG. 9B

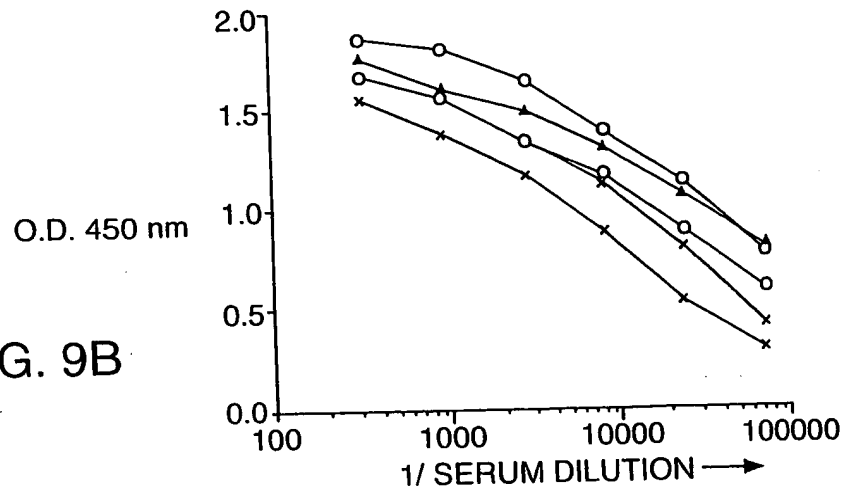
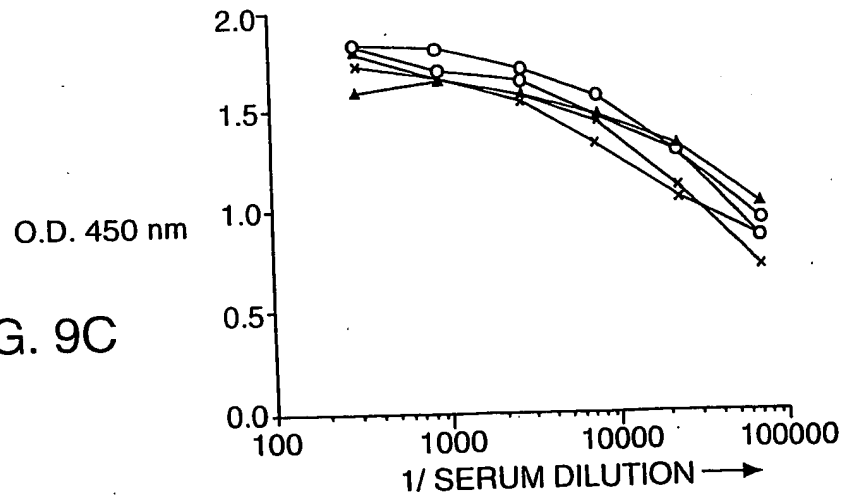


FIG. 9C



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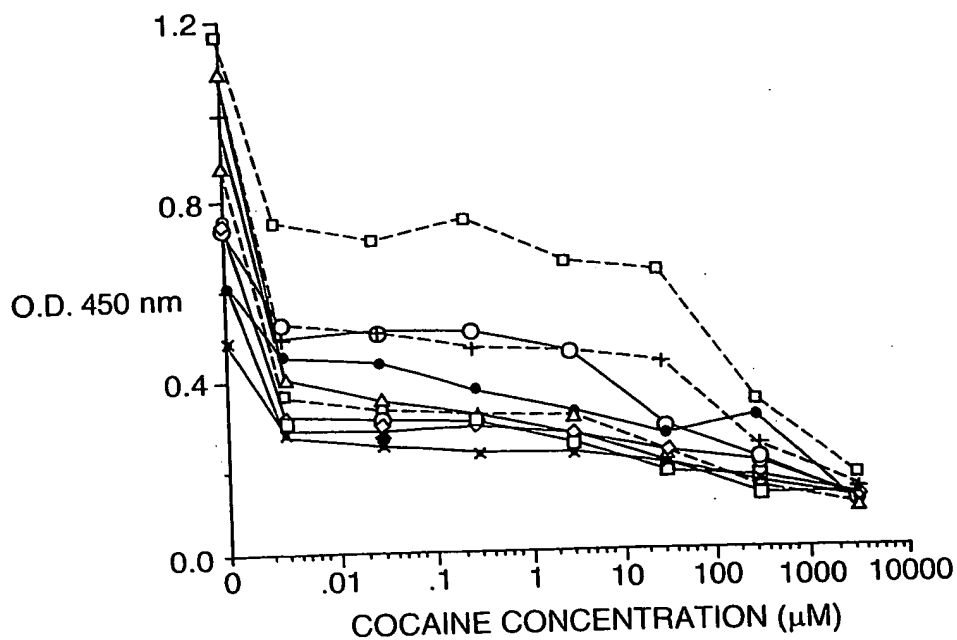


FIG. 10A

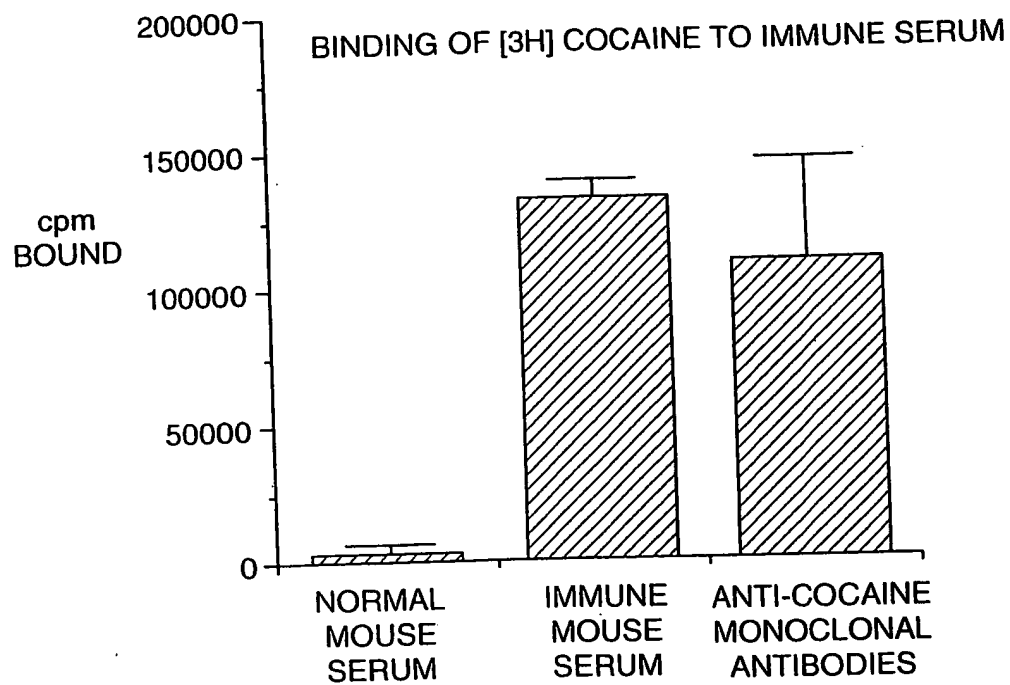


FIG. 10B

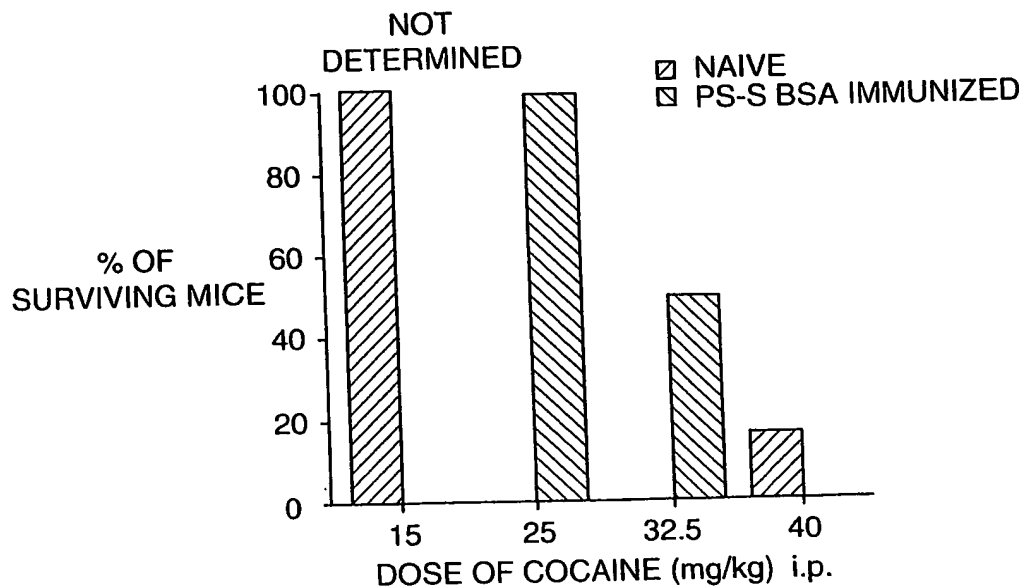


FIG. 11A

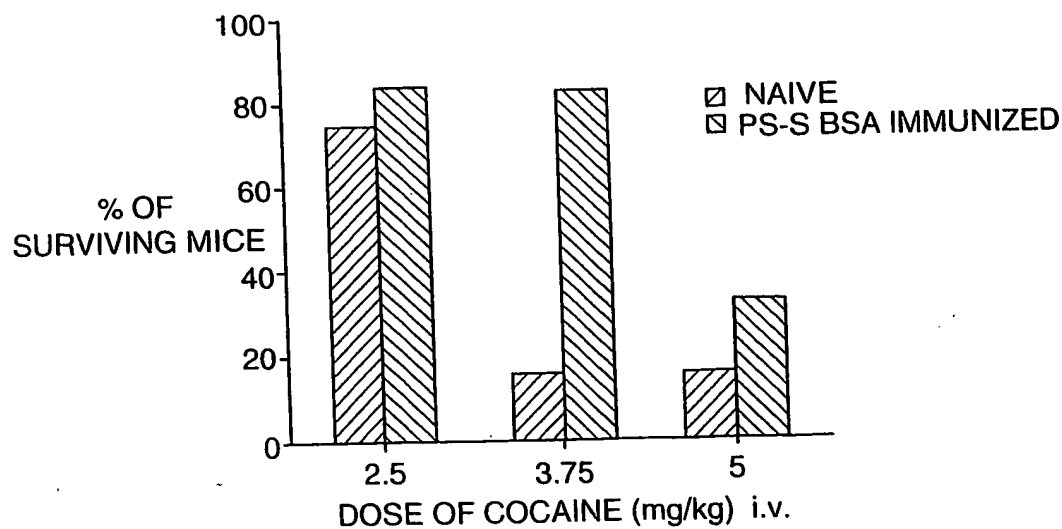
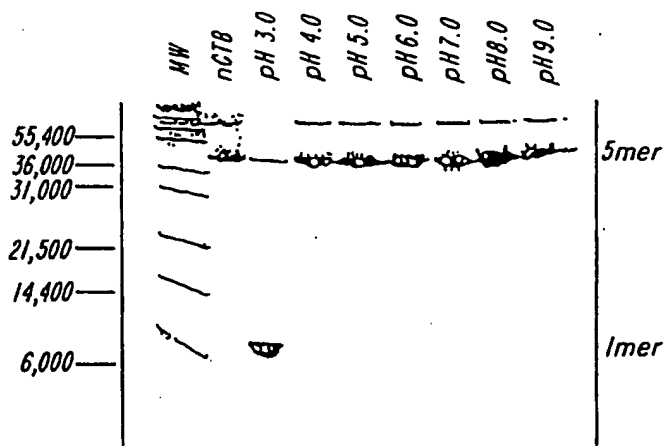
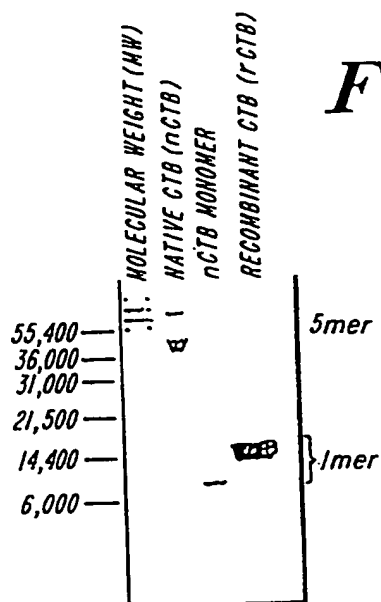
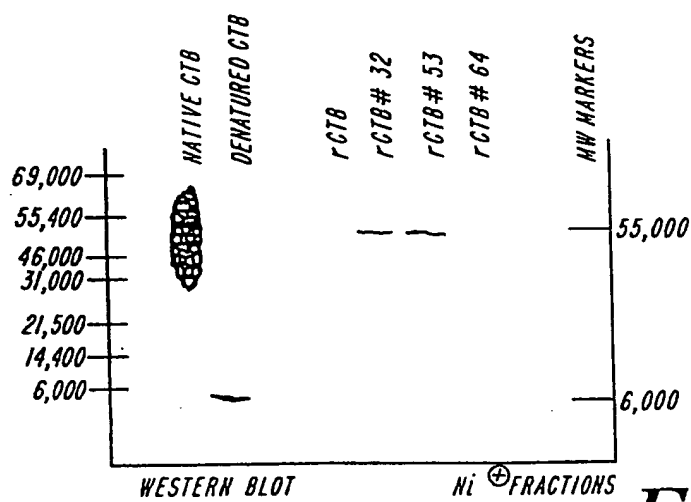
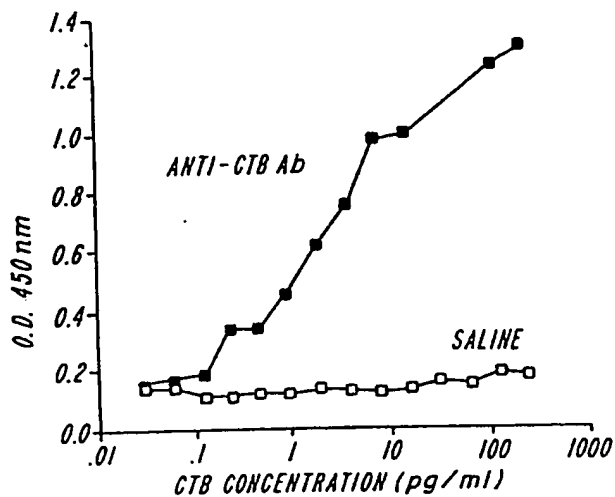


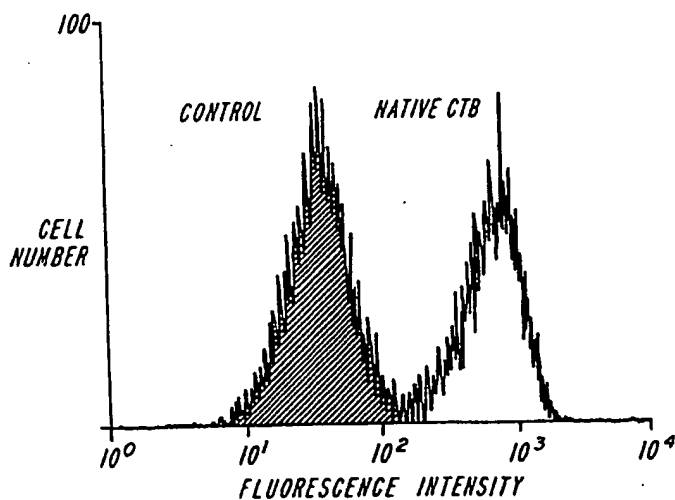
FIG. 11B

**FIG. 12B**

**FIG. 12C**



**FIG. 13A**



**FIG. 13B**

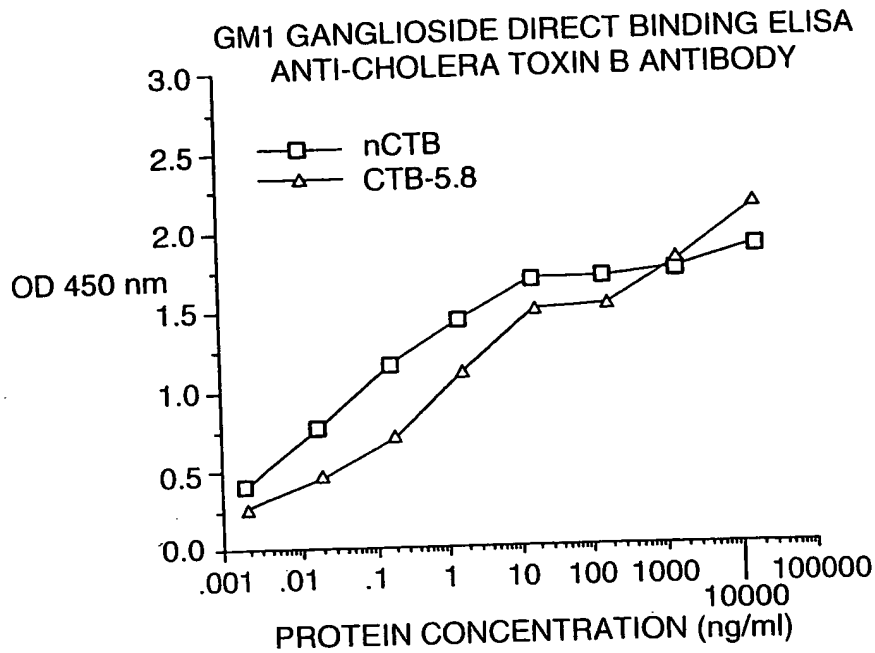


FIG. 14A

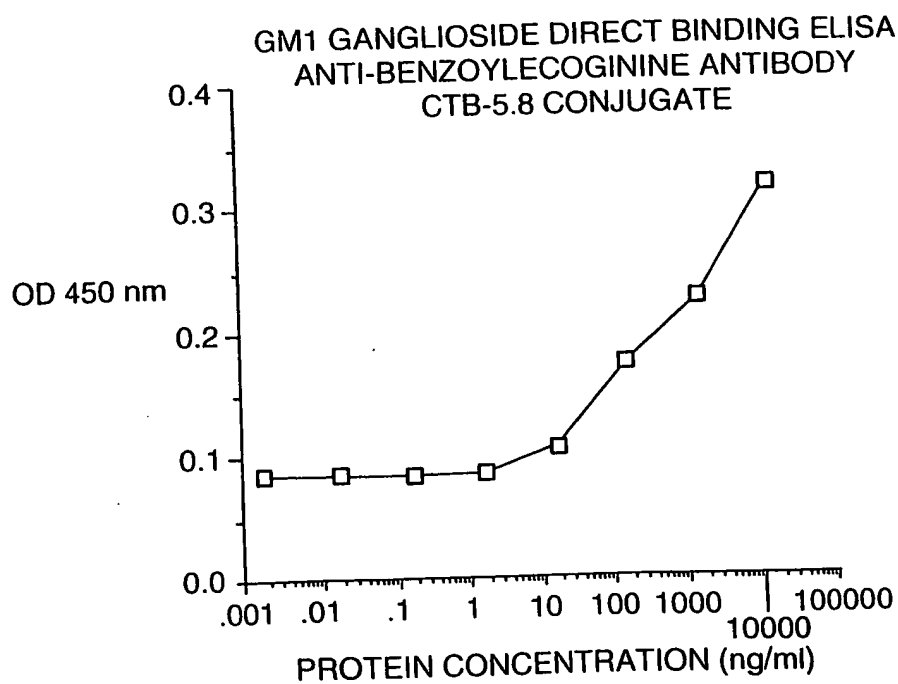


FIG. 14B



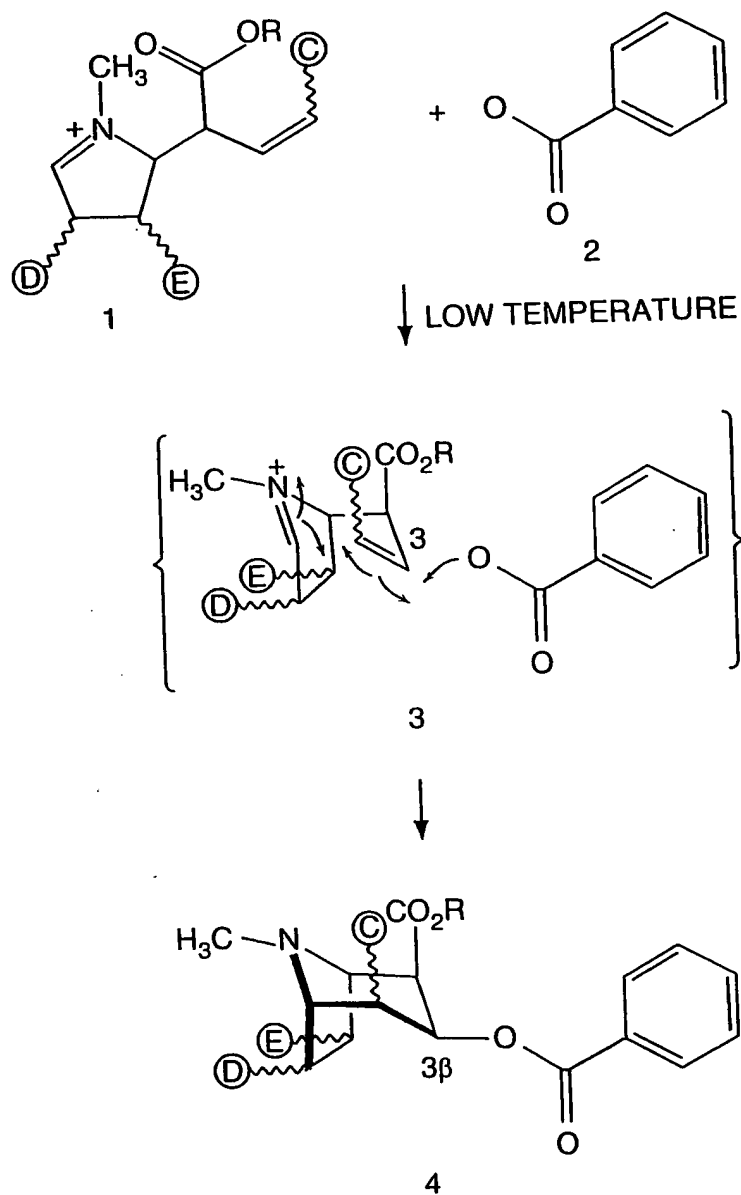


FIG. 15

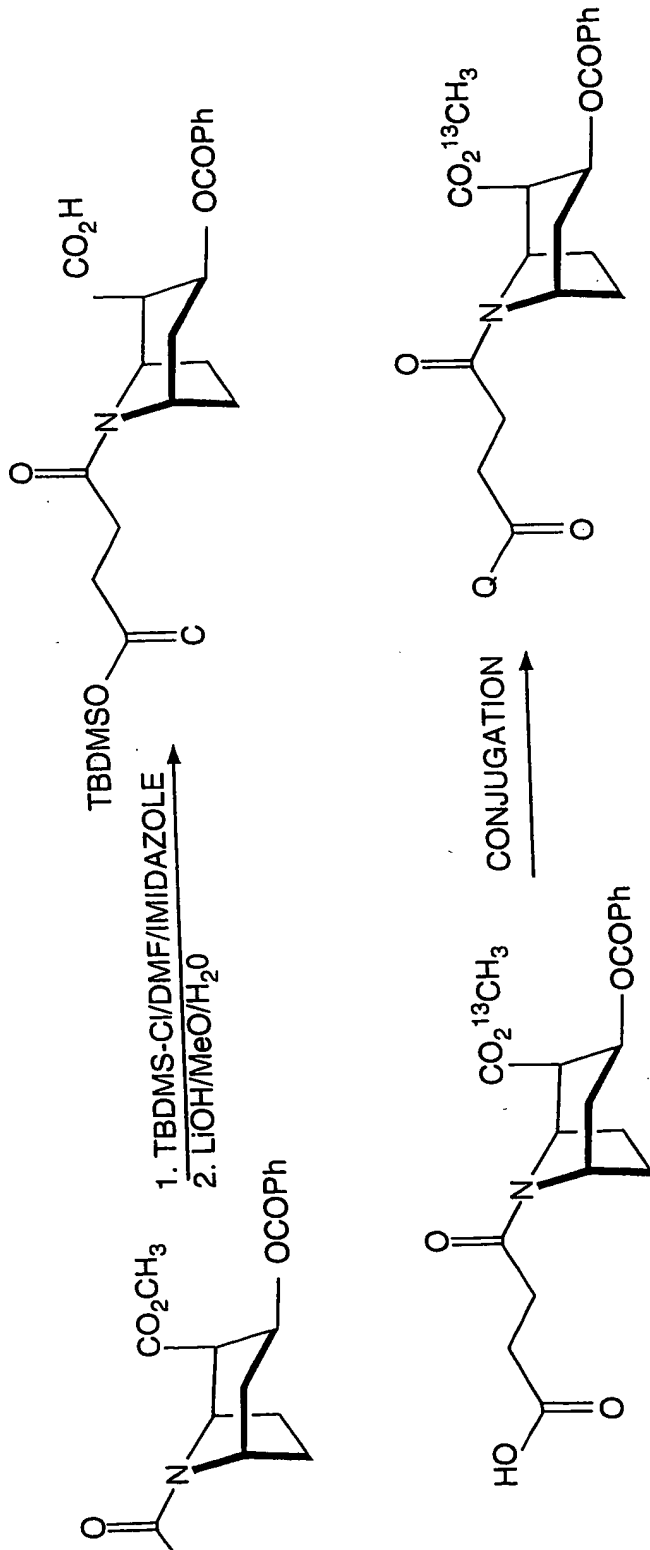


FIG. 16

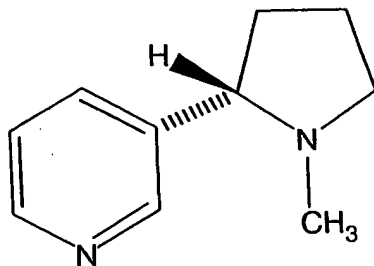


FIG. 17A

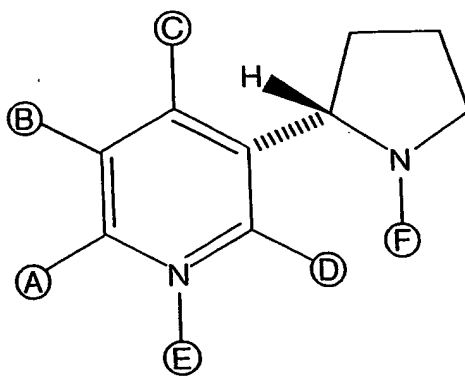


FIG. 17B

	A	B	C	D	E	F
PS-51	CJ1 where Q=COOH or where Q=CJ1.2, wherein Q=T-cell epitope containing carrier.	CJ0 where Q=H	CJ0 where Q=H	CJ0 where Q=H	---	CJ0 where Q=CH <sub>3</sub>
PS-52	CJ0 where Q=H	CJ1 where Q=COOH or where Q=CJ1.2, wherein Q=T-cell epitope containing carrier.	CJ0 where Q=H	CJ0 where Q=H	---	CJ0 where Q=CH <sub>3</sub>
PS-53	CJ0 where Q=H	CJ0 where Q=H	CJ1 where Q=COOH or where Q=CJ1.2, wherein Q=T-cell epitope containing carrier.	CJ0 where Q=H	---	CJ0 where Q=CH <sub>3</sub>
PS-54	CJ0 where Q=H	CJ0 where Q=H	CJ0 where Q=H	CJ0 where Q=H	---	CJ3 where Q=OH or T-cell epitope containing carrier, n=2
PS-55	CJ0 where Q=H	CJ0 where Q=H	CJ0 where Q=H	CJ0 where Q=H	CJ1 where Q=H or a T-cell epitope containing carrier n=3	CJ0 where Q=CH <sub>3</sub>
PS-56	CJ0 where Q=H	CJ0 where Q=H	CJ0 where Q=H	CJ0 where Q=H	CJ1 where Q=H or a T-cell epitope containing carrier n=4	CJ0 where Q=CH <sub>3</sub>
PS-57	CJ0 where Q=H	CJ0 where Q=H	CJ0 where Q=H	CJ0 where Q=H	CJ1 where Q=H or a T-cell epitope containing carrier n=5	CJ0 where Q=CH <sub>3</sub>

FIG. 18A

	A	B	C	D	E	F
PS-58	CJ0 where Q=H	CJ0 where Q=H	CJ0 where Q=H	CJ0 where Q=H	CJ1 where Q=H or a T-cell epitope containing carrier n=7	CJ0 where Q=CH <sub>3</sub>
PS-59	CJ11 where Y=NH Q=OH or T-cell epitope containing carrier	CJ0 where Q=H	CJ0 where Q=H	CJ0 where Q=H	- - -	CJ0 where Q=CH <sub>3</sub>
PS-40	CJ0 where Q=H	CJ11 where Y=NH Q=OH or T-cell epitope containing carrier	CJ0 where Q=H	CJ0 where Q=H	- - -	CJ0 where Q=CH <sub>3</sub>

FIG. 18B

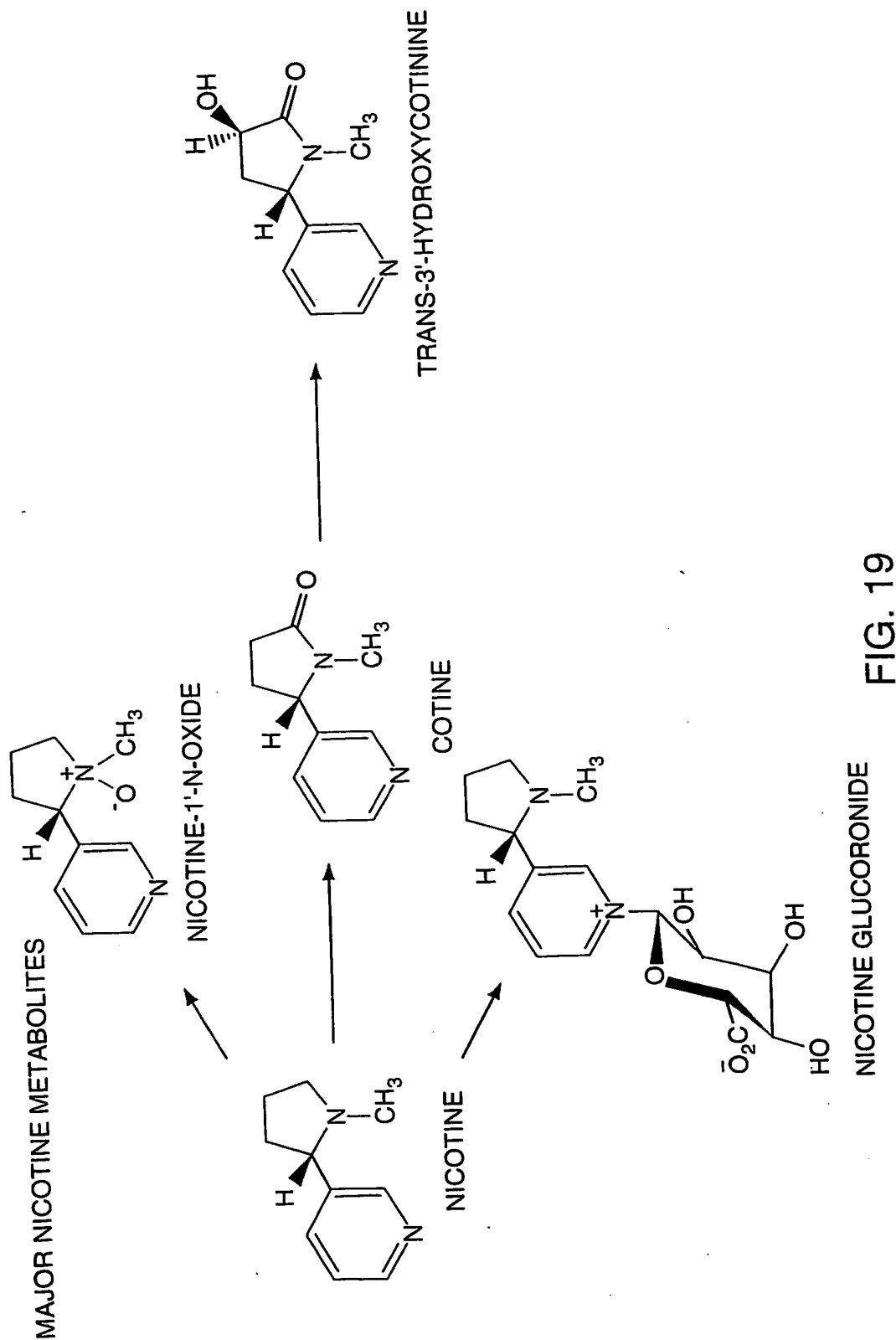


FIG. 19

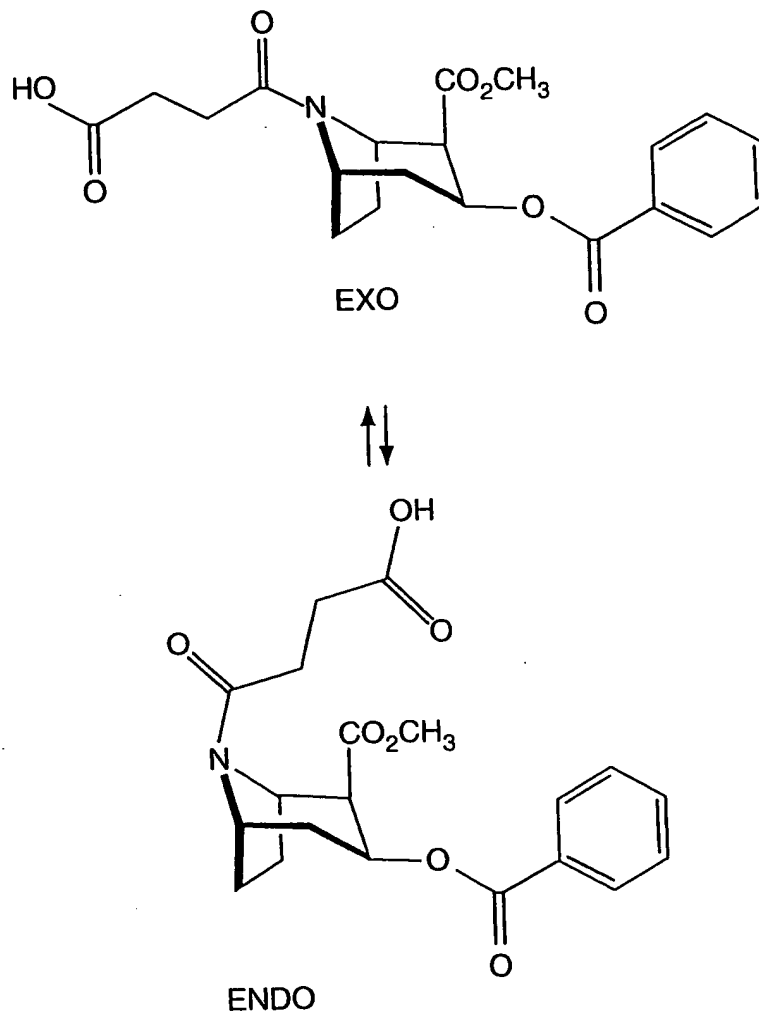


FIG. 20

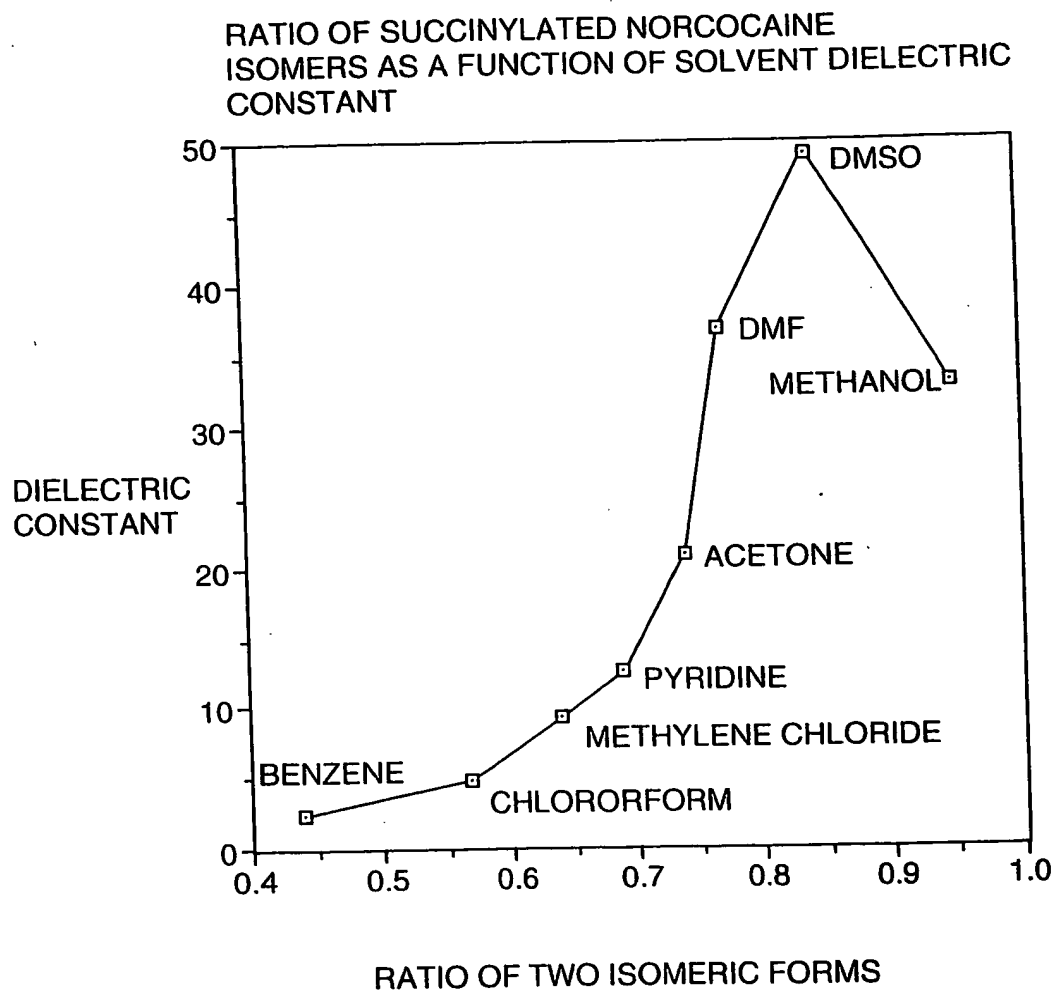
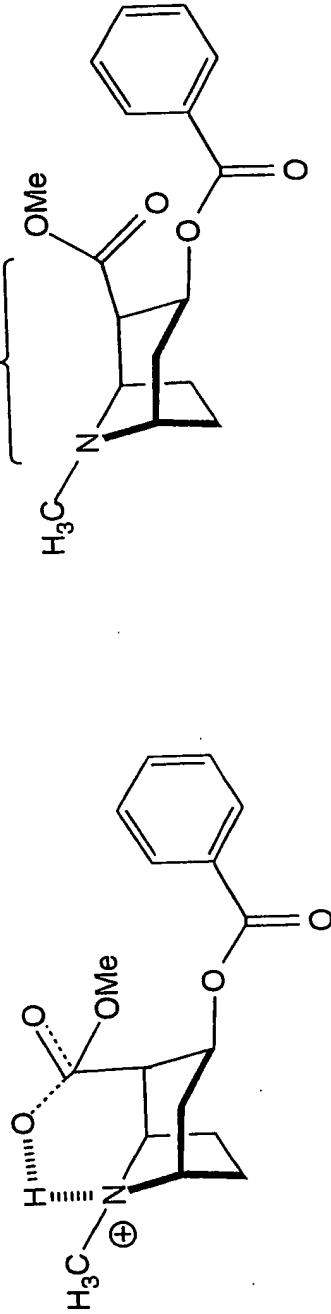


FIG. 21

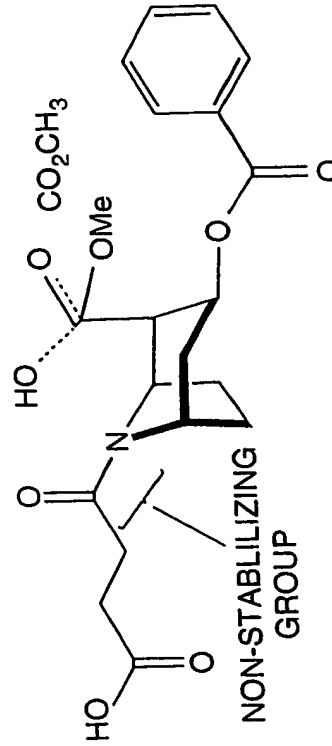


DISTANCE TOO FAR BETWEEN ESTER AND NITROGEN FOR  
 ENHANCED STABILITY OF INTERMEDIATE



PSEUDOCOCAINE

INTERMEDIATE OF COCAINE HYDROLYSIS



HYDROLYZED SUCCINYLATED NORCOCAINE INTERMEDIATE

FIG. 22

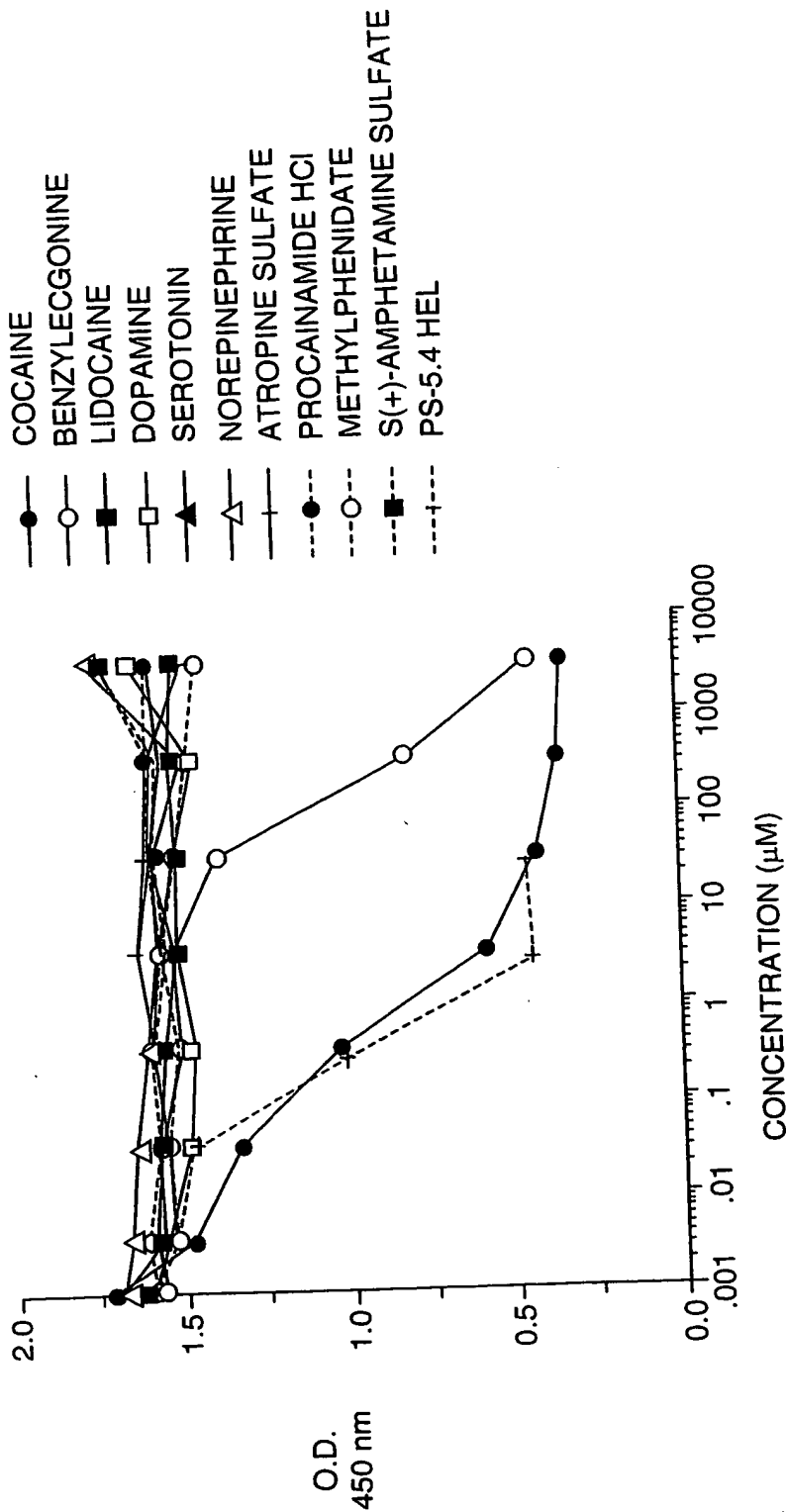


FIG. 23

STRONG ANTIBODY RESPONSES INDUCE  
BY NICOTINE-BSA CONJUGATE

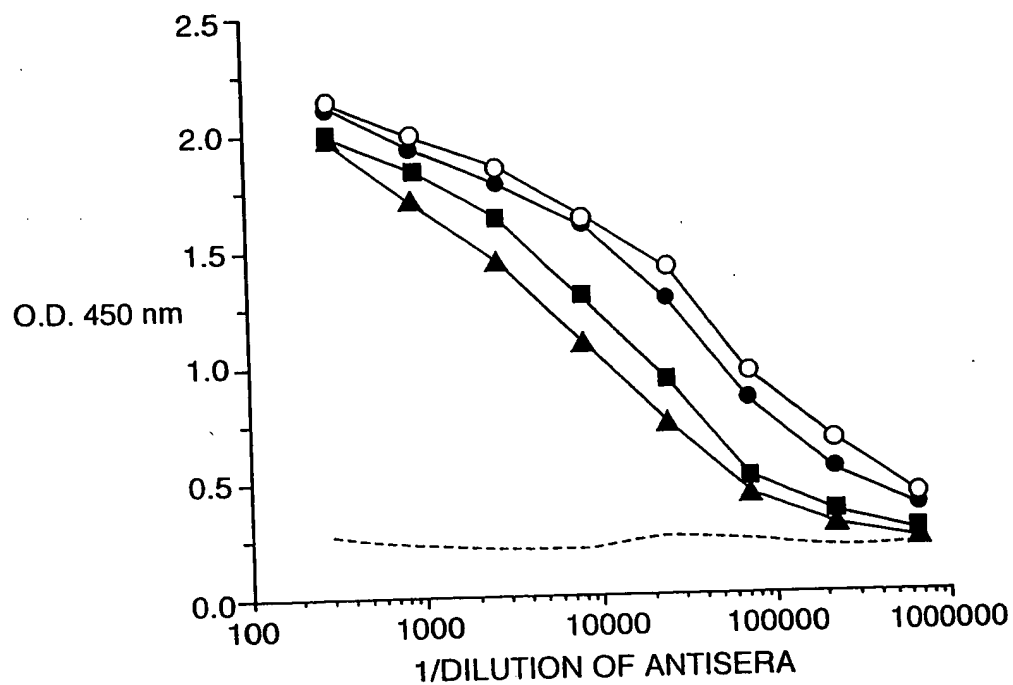
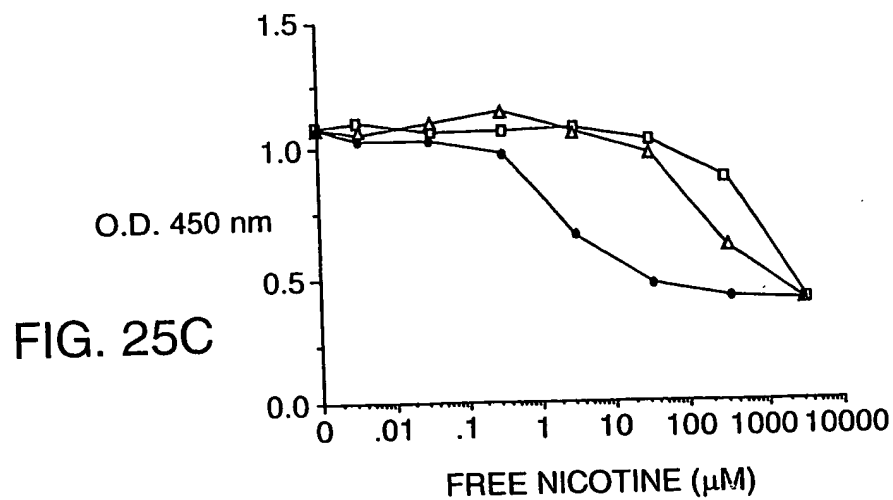
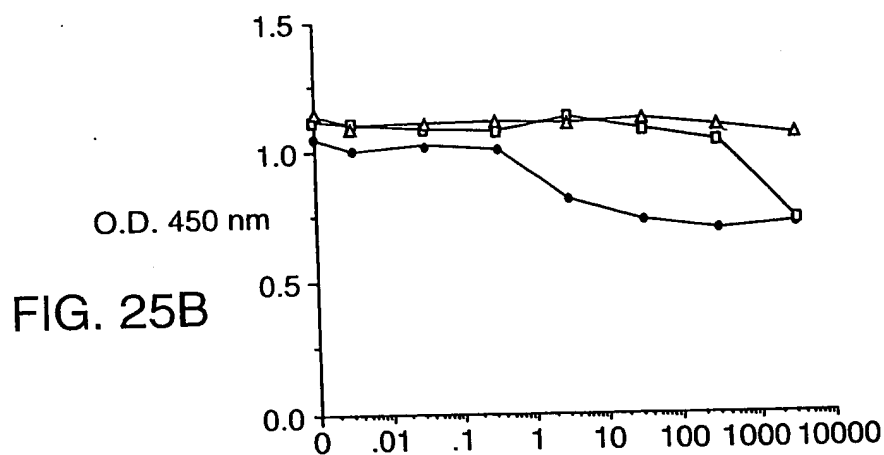
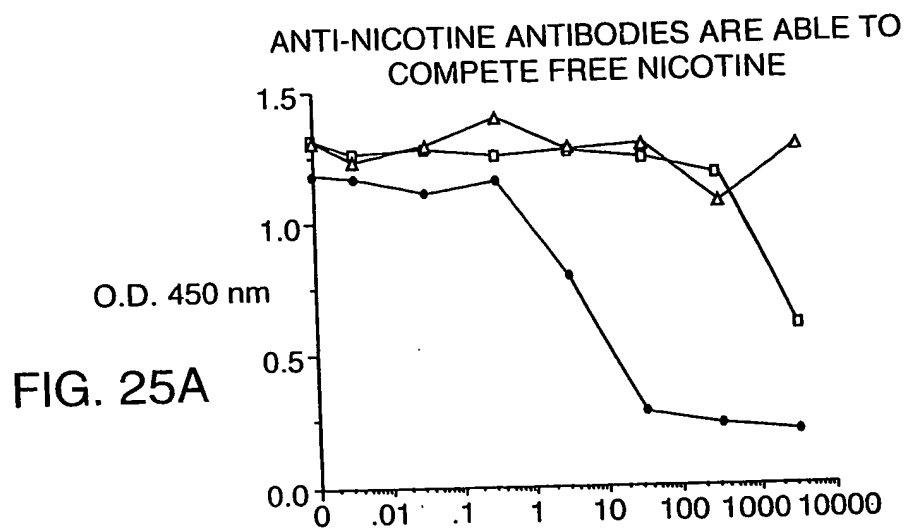
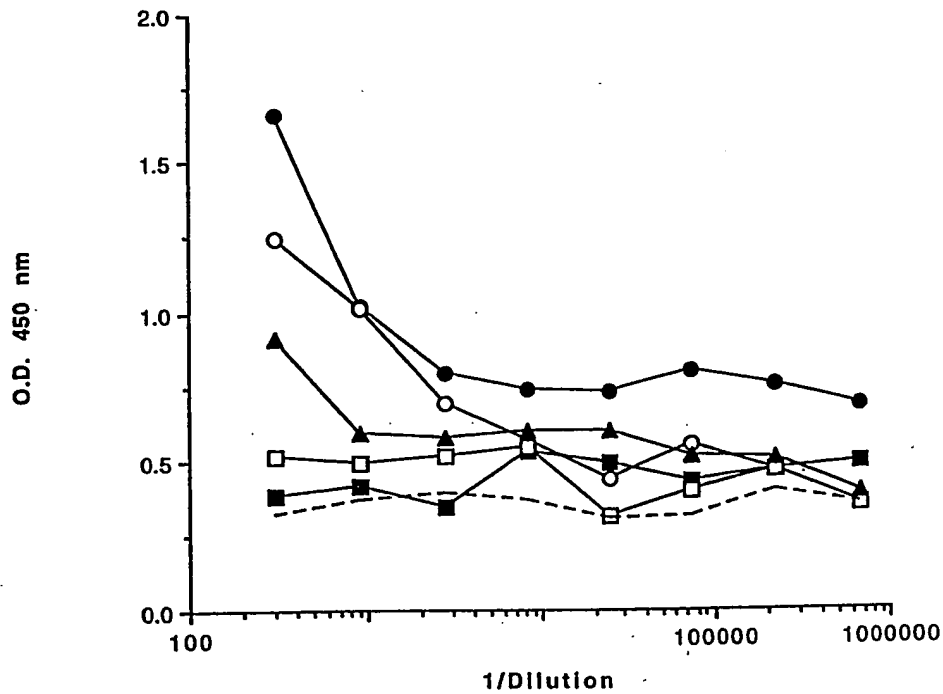


FIG. 24



**Production of anti-cocaine antibodies in Wistar rats****FIG.26**

ANTI-COCAINE ANTIBODIES GENERATED IN WISTAR RATS  
ARE ABLE TO BIND FREE COCAINE

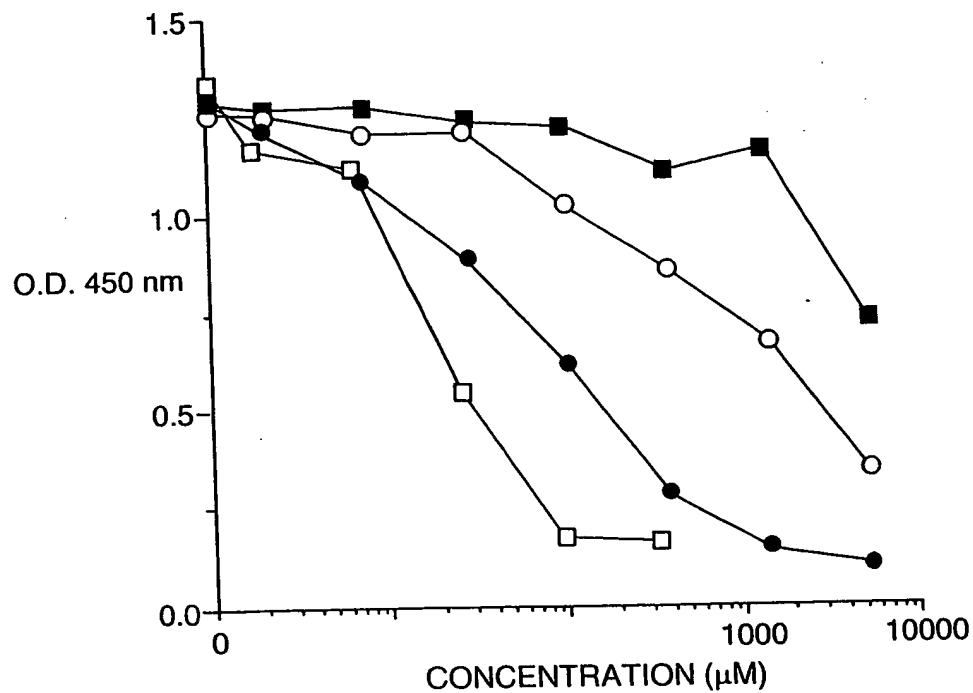


FIG. 27